

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



M.Tech. (Second Semester - Regular) Examinations, May – 2026

24MISPC12001 – Identification and Risk Management

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Define hazard, risk, and process safety with suitable examples.	CO1	K1
b. Apply Event Tree Analysis (ETA) to outline possible outcomes after a gas leak incident.	CO4	K3
c. Describe the principle of an Accelerated Rate Calorimeter (ARC) and its importance in safety studies.	CO3	K2
d. Identify possible explosion effects (UVCE, flash fire, confined explosion) in a refinery unit.	CO5	K3
e. Suggest how data obtained from DSC or ARC can be used in hazard evaluation software.	CO6	K3

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Demonstrate how hazard identification can be carried out at the design stage of a process plant using appropriate techniques.	5	CO1	K3
b. Apply a suitable hazard evaluation technique (e.g., HAZOP or Checklist method) to identify risks in a pressure vessel system.	5	CO2	K3
(OR)			
c. Analyze the effectiveness of inherent safety principles in reducing process hazards compared to add-on safety systems.	5	CO1	K4
d. Examine the factors influencing the selection of hazard evaluation techniques in a complex process industry.	5	CO2	K4
3.a. Describe different types of explosive testing equipment and their role in process safety evaluation.	5	CO3	K2
b. Explain the concept and methodology of Preliminary Hazard Analysis (PHA) with suitable examples.	5	CO3	K2
(OR)			
c. Demonstrate the application of FMEA in identifying failure modes in a pump system.	5	CO4	K3
d. Apply HAZOP methodology to analyze deviations in a pipeline system.	5	CO4	K3
4.a. Explain the working principle of a Differential Scanning Calorimeter (DSC) and its role in thermal hazard analysis.	5	CO3	K2
b. Describe the principle and applications of Thermo Gravimetric Analysis (TGA) in process safety.	5	CO3	K2
(OR)			
c. Apply DSC data to evaluate the thermal stability of a chemical compound used in a reactor.	5	CO3	K3
d. Apply ARC data to determine the potential for thermal runaway in an exothermic reaction system.	5	CO4	K3
5.a. Explain the different types of source terms (gas/vapor, liquid, two-phase release) in consequence analysis.	5	CO4	K2

b.	Describe the mechanisms and characteristics of BLEVE, pool fire, and jet fire.	5	CO4	K2
(OR)				
c.	Analyze the effect of release conditions (pressure, temperature, phase) on source term estimation.	5	CO4	K4
d.	Examine the role of dispersion modeling in evaluating toxic effects of chemical releases.	5	CO6	K4
6.a.	Explain the process of deriving accident scenarios from hazard evaluation studies such as HAZOP and FMEA.	5	CO5	K2
b.	Describe the concept of consequence severity and frequency of initiating events in risk analysis.	5	CO5	K2
(OR)				
c.	Examine the effectiveness of different types of safeguards (preventive, protective, mitigative) in reducing risk.	5	CO5	K4
d.	Analyze the steps involved in Layer of Protection Analysis (LOPA) and their significance in risk reduction.	5	CO5	K4

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